

**REMARKS**

Claims 1 through 7 are pending in this Application. Claims 2 and 7 have been amended to address formalistic issues. Applicants submit that the present Amendment does not generate any new matter issue.

**Claim 1 was rejected under 35 U.S.C. § 103 for obviousness predicated upon Fermann in view of Agrawal and Stolen.**

In the statement of rejection the Examiner made certain factual determinations as to the teachings of Fermann, the primary reference, and Applicants do not agree with the Examiner's determinations. The Examiner admitted that Fermann does not disclose a numerical value of the nonlinear coefficient of the transmission fiber. The Examiner then asserted that Stolen teaches that fibers with larger nonlinear coefficients produce higher gains, and that Agrawal teaches how to modify fiber parameters. The Examiner then concluded that one having ordinary skill in the art would have been motivated to place a fiber with a high nonlinear coefficient and a negative dispersion at the signal frequency in the device of Fermann. This rejection is traversed.

Applicants submit that there are significant differences between the claimed optical transmission system and that disclosed by the applied prior art, such that even if the applied references are combined as suggested by the Examiner, and Applicants do not agree that the requisite fact-based motivation has been established, the claimed invention would not result. *Uniroyal, Inc. v. Rudkin-Wiley Corp.*, 837 F.2d 1044, 5 USPQ2d 1434 (Fed. Cir. 1988). Moreover, Applicants submit that the Examiner did not establish the requisite realistic motivation for combining the applied references.

### Insufficient Facts

There are more differences between the optical transmission system defined in independent claim 1 and Fermann than identified by the Examiner. Specifically, Fermann discloses light sources of high-power ultrashort laser pulses. In applying Fermann's source to optical communications, as described in Fig. 17, Fermann's source is used as the pumping light source, **not** as a signal light source. In addition, Fermann discloses that the source has a wavelength-variable function.

However, the claimed invention is directed to an optical transmission system for optical communications comprising: a signal light source for optical communications; a lumped Raman amplifier; and an optical fiber transmission line through which the signal light passes. Thus, the source of Fermann is **completely different** from the claimed invention, as is the technical field.

Indeed, the Examiner asserted that Fig. 2 of Fermann discloses a seed source as a femtosecond laser. However, Fig. 2 of Fermann does **not** show an optical transmission system for optical communications.

Further, the Raman shifter 10 of Fermann is designed for **shifting** a wavelength of signal light – **it is not an amplifier**. Repeat, the Raman shifter 10 of Fermann is **not an amplifier**. As disclosed in Fig. 1, Fermann's source temporarily spreads a pulse width of light from the seed source by employing the PSM, efficiently amplifies light by AM1, and temporarily spreads the pulse width of the light by PCM, in the combination of seed source, PSM, AM1 and PCM. However, in accordance with the claimed invention, a **Raman amplifier amplifies the signal light** with a positive chirp by the fiber having a negative chromatic dispersion and a nonlinear coefficient of 6.9 (1/W/km) or more.

It is, therefore, apparent that in accordance with the present invention the lumped Raman amplifier includes an optical fiber for Raman amplification having a negative chromatic dispersion and a nonlinear coefficient of 6.9 (1/W/km) or greater. However, Fermann neither discloses nor suggests such an optical fiber. Nor is it apparent that any such optical fiber would be of use to Fermann.

The secondary references cannot be said to cure the agued deficiencies of Fermann. Firstly, Stolen discloses a Parametric amplifier. Stolen neither discloses nor suggests a **Raman amplifier**. The Examiner says that fibers with large nonlinear coefficients produce higher gains. But the Examiner's statement is **broad**er than the reference to Stolen which is conspicuously confined to a Parametric amplifier. What Stolen discloses is that the gain of the amplifier of the Parametric amplifier becomes high. **Stolen neither discloses nor suggests a Raman gain coefficient.**

In contradistinction to Stolen, in accordance with the claimed invention, the Raman amplifier includes a fiber with a negative chromatic dispersion and a nonlinear coefficient of 6.9 (1/W/km) or more, thereby actively generating a self-phase modulation (SPM). By employing the SPM, the claimed invention compensates for the positive chirp of signal light.

Agrawal teaches the dispersion parameter of  $\beta_2$ . However, Agrawal neither discloses nor suggests a nonlinear coefficient.

In order to establish the requisite realistic motivation, the Examiner must make clear and particular factual findings as to a specific understanding or specific technological principle, and then based upon such facts explain why one having ordinary skill in the art would have realistically been led to modify particular prior art, in this case the particular structure of Fermann, to arrive at the claimed invention. *In re Lee*, 237 F.3d 1338, 61 USPQ2d 1430 (Fed.

*Cir. 2002*); *Ecolochem Inc. v. Southern California Edison, Co.*, 227 F.3d 1361, 56 USPQ2d 1065 (Fed. Cir. 2000); *In re Kotzab*, 217 F.3d 1365, 55 USPQ 1313 (Fed. Cir. 2000); *In re Dembiczak*, 175 F.3d 994, 50 USPQ2d 1614 (Fed. Cir. 1999); *In re Rouffet*, 149 F.3d 1350, 47 USPQ2d 1453 (Fed. Cir. 1998). As pointed out above, Stolen does not even relate to a Raman amplifier or teach anything about a Raman gain coefficient. Agrawal teaches nothing about a nonlinear coefficient. Fermann, the primary reference, does not even address the use of a Raman amplifier to begin with. It is not apparent and the Examiner did not discharge the judicial burden of articulating **how or why** one having ordinary skill in the art would somehow have been realistically motivated to combine these disparate teachings, motivated by a reasonable expectation of achieving the objectives of Fermann. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). The only apparent motivation for reconstructing the applied references is found in Applicants' disclosure, which is forbidden territory upon which the Examiner may trespass for the requisite motivational element. *Panduit Corp. v. Dennison Mfg. Co.*, 774 F.2d 1082, 227 USPQ 337 (Fed. Cir. 1985). Moreover, based upon the above articulated differences between the claimed invention and the applied prior art, it should be apparent that even if the applied references are combined, and again Applicants do not agree that the requisite fact-based motivation has been established, the claimed invention would not result. *Uniroyal, Inc. v. Rudkin-Wiley Corp.*, *supra*.

Applicants, therefore, submit that the imposed rejection of claim 1 under 35 U.S.C. § 103 for obviousness predicated upon Fermann in view of Agrawal and Stolen is not factually or legally viable and, hence, solicit withdrawal thereof.

**Claims 3, 4, 6 and 7 were rejected under 35 U.S.C. § 103 for obviousness predicated upon Fermann in view of Agrawal and Stolen.**

**Claim 5 was rejected under 35 U.S.C. § 103 for obviousness predicated upon Fermann in view of Agrawal, Stolen and Akasaka.**

Each of the above rejections of claims 3, 4, 6 and 7 and of claim 5 is traversed. Specifically, claims 3 through 7 depend from independent claim 1. Applicants incorporate herein the arguments previously advanced in traversing the imposed rejection of claim 1 under 35 U.S.C. § 103 for obviousness predicated upon Fermann in view of Agrawal and Stolen. The Examiner's additional comments and secondary reference to Akasaka do not cure the previously argued deficiencies in the attempted combination of predicated upon Fermann, Agrawal and Stolen.

Applicants, therefore, submit that the imposed rejection of claims 3, 4, 6 and 7 under 35 U.S.C. § 103 for obviousness predicated upon Fermann in view of Agrawal and Stolen, and the imposed rejection of claim 5 under 35 U.S.C. § 103 for obviousness predicated upon Fermann in view of Agrawal, Stolen and Akasaka, are not factually or legally viable and, hence, solicit withdrawal thereof.

## **Claim 2**

Applicants note that the Examiner did not specifically reject **claim 2<sup>1</sup>**, which has been amended to depend from claim 1. Accordingly, claim 2 is clearly free of the applied prior art by virtue of its dependence upon claim 1.

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<sup>1</sup> In the Office Action Summary, claim 2 was grouped with the rejected claims.


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Based upon the foregoing it should be apparent that the imposed rejections have been overcome and that all pending claims are in condition for immediate allowance. Favorable consideration is, therefore, solicited.

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 500417 and please credit any excess fees to such deposit account.

Respectfully submitted,

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